CLAIMS

1. A method of performing echo suppression in a telecommunications system, including the steps of:

(A) calculating the energy represented in each PCM sample of both the voice information received from a user's telephone equipment, and transmitted from to the telephone equipment;

(B) aggregating the energy data for samples over a 5-msec period to form a frame of an aggregate energy value;

(C) populating a matrix with these aggregate energy values;

(D) solving the normal equations for the matrix;

(E) examining the results to determine a peak aggregate result which will indicate the time delay and gain of the echo path; and

(F) evaluating incoming samples on a periodic basis against the corresponding output energy result obtained at the determined time delay, and if the input speech energy is determined to be less than a historical output energy scaled by the determined gain, then the signal is classified as echo and is suppressed from the input speech signal.

2. The method of performing echo suppression as defined in claim 1 including the further step of

smoothing the results of the normal equations by applying a moving average to correlations and energies over each frame across the time dimension.

3. The method of performing echo suppression as defined in claim 1 including the further step of

determining said time delay by measuring the time elapsed between the beginning of measurements and the reaching of the peak aggregate result.

4. The method of performing echo suppression as defined in claim 1 including the further step of

employing a voice activity detector to verify that voice information is on the line and if so, then performing steps A through F and suppressing any echo that is determined to exist.

5. An apparatus for performing echo suppression techniques in a telecommunications system, comprising:

(A) a receiver that receives PCM samples of voice information from a user coupled with the system;

(B) an energy accumulator coupled to said receiver that calculates the energy of the input speech signals and aggregates these energies over a predetermined time period;

(C) digital signal processing circuitry coupled with said receiver and said energy accumulator that is programmed to perform the following:

(i) populate a matrix with energy aggregate values for 5 msec frames;

(ii) solve or approximate the solution to normal equations for said matrix;

(iii) produce results and evaluate said results to find a peak aggregate value and a time lag;

(D) checking each incoming speech sample against said peak aggregate value and time lag to determine whether said speech samples contain echo; and

(E) means for suppressing echo that is determined to exist in an incoming speech sample.

6. The apparatus for performing echo suppression techniques as defined in claim 5 further comprising

voice activity detector coupled with said receiver that determines whether incoming samples contain speech, and if so, said echo suppression techniques are performed.